GROUNDWATER MODELING UPDATE

Week of October 12, 2012

Current Activities

- The past several weeks have been spent reviewing literature and fundamental principles related to the mass transport of EDB. The purpose was to evaluate whether to include sorption and decay (biodegradation), and if so, how best to simulate those processes.
- As for sorption, it seems best not to include sorption because the reported organic carbon partition coefficient for EDB (28.2 mL/g) and the fraction of organic carbon in the aquifer (0.00023 g/g), as utilized in the equation to determine a retardation factor [R=1+(dry bulk mass density/porosity)/distribution coefficient], indicate that little retardation is occurring.
- Biodegradation seems to show more potential than sorption. A simple check of concentration trends in selected wells was made using data from 2008-2012. About ½ of the wells indicated declining trends. However, there are uncertainties. For example: (i) the time-frame is short covering only 4-years, (ii) different analytical results are provided for certain wells for the same sampling date; and (iii) about half the wells do not show a declining trend.
- Making the assumption that some biodegradation is occurring, first-order decay constants were calculated for those wells showing declines [ln (Ct/Co)/t]. Those preliminary first-order rate constants range from 2.6 to 0.33 years. By comparison, a 2008 EPA publication presents rate constants of 0.03 to 1.3 years for field studies of EDB in aquifer flow paths.
- The above reviews and evaluations are important in terms of setting up the model for contaminant mass transport. This is a significant milestone and the next project phases relate mainly to conducting model runs.

Upcoming Activities

- As soon as concentration data from the recently installed wells are available I will include in the model.
- In the meantime, I will be developing a systematic approach for making model runs, and starting to perform runs to evaluate plume movement.
- We have previously discussed a second meeting in Albuquerque and I will be in contact about that in the near future.

Overall Current Project Status: Fate and transport modeling being performed